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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,316	12/28/2001	Hisashi Tsukamoto	Q130-US1	8911
31815	7590	03/11/2004	EXAMINER	
MARY ELIZABETH BUSH QUALLION LLC P.O. BOX 923127 SYLMAR, CA 91392-3127			TSANG FOSTER, SUSY N	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 03/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/034,316

Applicant(s)

TSUKAMOTO, HISASHI

Examiner

Susy N Tsang-Foster

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/3/2003, 12/3/2003, 12/18/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-19, 26-31, 54 and 55 is/are allowed.
- 6) ☒ Claim(s) 1-15, 20-23, 25 and 32-53 is/are rejected.
- 7) ☒ Claim(s) 16 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/9/2003 has been entered.

Response to Amendment

2. This Office Action is responsive to the amendment filed on 12/9/2003, applicant's remarks filed on 11/13/2003, and the Interview Summary Supplement filed on 12/18/2003. It is noted that applicant's submission of 11/13/2003 for amendments made to the specification has not been entered since this submission was not submitted in the amendment filed on 12/9/2003. Applicant is kindly requested to resubmit the amendment to the specification that was filed in the amendment dated 11/13/2003 that was considered non-compliant and therefore was not entered into the system.

Previous art rejections based on Narang et al. of record are withdrawn in view of applicant's remarks on page 18 of the amendment filed on 11/13/2003 and amendments made to claim 1 reciting a liquid nonaqueous electrolyte. Previous art rejections based on Arai (US 6,210,835 B1) are withdrawn in view of applicant's amendment to the claims and applicant's

Application/Control Number: 10/034,316

Art Unit: 1745

remarks on page 19 of the amendment filed on 11/13/2003; specifically, Arai does not teach or suggest either an energy storage device comprising a nonaqueous electrolyte solution and a flame retardant material that are substantially immiscible, that is, when mixed, form a meniscus between them.

During the personal interview conducted on 12/2/2003, applicant's representative gave a power point presentation which showed a significant difference in battery performance with respect to the order in which the electrolyte solution or flame retardant is added where adding electrolyte solution first gives a higher discharge capacity and lower resistance and adding flame retardant first that is immiscible with the nonaqueous electrolyte solution gives lower discharge capacity and higher resistance. In view of these unexpected results, method claims 17-19, 54, and 55 are allowed.

It must be emphasized that the Examiner does not recall seeing Exhibit A filed on 12/18/2003 during the personal interview dated 12/2/2003. After reviewing Exhibit A filed on 12/18/2003, the Examiner is withdrawing her remarks made during the interview summary regarding the JP 10-012272 reference in view of the experimental results shown in Exhibit A.

The previous 112 first paragraph rejections of record are withdrawn in view of amendments made to claim 18 and Ms. Bush's statement during the interview on 12/2/2003 and applicant's remarks dated 11/13/2003 that flame retardant materials are well known to one of ordinary skill in the art and therefore there would be no undue burden to determine which flame

Application/Control Number: 10/034,316

Art Unit: 1745

retardant material would be a liquid at room temperature and pressure and is substantially immiscible in the nonaqueous electrolyte solution.

Specification

3. The amendment filed 02 June 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

On page 15 of the specification, adding the statement “[a]fter filling the casing at least partially with the non-aqueous electrolyte solution, the energy storage device may be charged either before or after adding the flame retardant material to the casing” constitutes new matter.

In contrast to applicant’s assertions on page 12 of the amendment, original claim 17 does not support this limitation.

Applicant is required to cancel the new matter in the reply to this Office Action.

4. The disclosure is objected to because of the following informalities:

One part of the specification appears to contradict another part of the specification.

Specifically, page 5, line 17 to page 6, line 1 of the specification state:

“[I]n practice, the two phase electrolyte system of the present invention realizes significant advantages over the prior art. Because the halogen-containing compound is not miscible in the non-aqueous electrolyte

Art Unit: 1745

solution, there is little ingress of the halogen-containing compound into the regions within the casing occupied by the non-aqueous electrolyte solution, i.e. in the casing regions separating the positive and negative poles and defined by the separator.”

and page 11, line 14 to page 12, line 2 of the specification state:

“[s]ubstantially immiscible means that when the non-aqueous electrolyte solution and the halogen-containing compound are mixed, a meniscus between the two liquids is formed and the concentration of the halogen-containing compound in the non-aqueous electrolyte solution is about 10wt% or less and preferably, 1000 ppm or less.”

However, this definition of “substantially immiscible” appears to contradict page 15, line 20 to page 16, line 5 of the specification.

Page 15, line 20 to page 16, line 8 of the specification state:

“[s]ince the non-aqueous electrolyte solution and the halogen-containing compound are substantially immiscible, one liquid phase within the battery casing is mainly non-aqueous electrolyte solution and the other liquid phase in the battery casing is mainly halogen-containing compound. In accordance with the present invention, the non-aqueous electrolyte solution phase occupies the region within the casing between the positive pole and the negative pole defined by the separator. As a result, the halogen-containing compound is not in the region between the positive pole and the negative pole defined by the separator and does not interfere with the oxidation-reduction processes at the poles and in the non-aqueous electrolyte solution”.

Art Unit: 1745

If the halogen-containing compound is substantially immiscible, then about 10 wt% or less or 1000 ppm or less would be in the nonaqueous electrolyte solution in contrast to page 15, line 20 to page 16, line 8 which state that the halogen-containing compound would not be in the region between the positive pole and the negative pole defined by the separator.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 33 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 33, the limitation “wherein the energy storage device is a first battery having a discharge capacity of at least 93.7% of the discharge capacity of a second battery prepared in the same manner as the first battery except not adding the flame retardant material” does not appear to be supported by the original disclosure. Instead, Table 1 of the specification only supports the following data points: 93.7%, 96.3%, 99.5% and 100.5%. The original disclosure does not support “at least 93.7%” which encompasses values such as 99%, 150%, 200%, etc.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 1745

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 20-23, and 32-53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 20, the limitation "a flame retardant material that is a liquid at room temperature and pressure and substantially immiscible in the nonaqueous electrolyte solution, and not in the region defined by the separator" is indefinite because it is unclear why the flame retardant material would not be in the region defined by the separator since the flame retardant material is substantially immiscible with the nonaqueous electrolyte solution which means that about 10 wt% or less or about 1000 ppm or less is in the nonaqueous electrolyte solution according to the definition given on page 15, line 20 to page 16, line 8 for the term "substantially immiscible".

It is noted that page 5, line 17 to page 6, line 1 of the specification states:

"[I]n practice, the two phase electrolyte system of the present invention realizes significant advantages over the prior art. Because the halogen-containing compound is not miscible in the non-aqueous electrolyte solution, there is little ingress of the halogen-containing compound into the regions within the casing occupied by the non-aqueous electrolyte solution, i.e. in the casing regions separating the positive and negative poles and defined by the separator."

Page 11, line 14 to page 12, line 2 of the specification state:

Art Unit: 1745

“[s]ubstantially immiscible means that when the non-aqueous electrolyte solution and the halogen-containing compound are mixed, a meniscus between the two liquids is formed and the concentration of the halogen-containing compound in the non-aqueous electrolyte solution is about 10wt% or less and preferably, 1000 ppm or less.”

In claim 52, the limitation “wherein the nonaqueous electrolyte solution contains about 10 wt% or less of the flame retardant material” is indefinite because it appears to contradict claim 20 from which it depends which recites “a nonaqueous electrolyte solution, including a nonaqueous solvent and a salt, occupying a region defined by the separator, and a flame retardant material that is a liquid at room temperature and pressure and substantially immiscible in the nonaqueous electrolyte solution, and not in the region defined by the separator.” Thus, it is unclear how the nonaqueous electrolyte solution contains about 10wt % or less of the flame retardant material if the flame retardant material is not in the region defined by the separator.

In claim 53, the limitation “wherein the nonaqueous electrolyte solution contains about 1000 ppm or less of the flame retardant material” is indefinite because it appears to contradict claim 20 from which it depends which recites “a nonaqueous electrolyte solution, including a nonaqueous solvent and a salt, occupying a region defined by the separator, and a flame retardant material that is a liquid at room temperature and pressure and substantially immiscible in the nonaqueous electrolyte solution, and not in the region defined by the separator.” Thus, it is unclear how the nonaqueous electrolyte solution contains about 1000 pm or less of the flame retardant material if the flame retardant material is not in the region defined by the separator.

Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-15 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by the IPDL JPO Machine translation for JP 10-012272 A.

In general, the machine translation for the reference discloses a nonaqueous electrolyte containing system comprising an electrolyte salt, a fluorine containing organic solvent as a flame retardant, a high dielectric constant solvent selected from the group consisting of propylene carbonate and ethylene carbonate, a hypoviscosity solvent selected from the group consisting of 1,2-dimethoxyethane, diethyl carbonate, dimethyl carbonate, and ethyl methyl carbonate, where the volume ratio of the hypoviscosity solvent to the high dielectric constant solvent is 1:3-8:1 to 1:4-2:1 (see paragraphs 9, and 19-23 and claims 1-6 of the machine translation). The fluorine containing organic solvent can be given by the formula (III) $F(CF_2)_aF$ where a is from 5-8 for a perfluoroalkyl compound (see paragraph 24 of machine translation) or by formula (IV): $R_1-O-(R_3-O)_6R_2$ for a perfluoroether compound where R_1 , R_2 , and R_3 are defined in paragraph 26 of

Art Unit: 1745

the machine translation and examples of the perfluoroalkyl compound is given in paragraph 27 of the machine translation and examples of the perfluoroether compounds are given in paragraph 28 of the machine translation.

The reference does not explicitly disclose that the flame retardant material is substantially immiscible in the nonaqueous electrolyte solution and forming a meniscus when mixed with the non-aqueous electrolyte solution.

Although the electrolytic solution contains the fluorine ether or perfluoroalkyl flame retardant in JP 10-012271 A, the reference is silent about whether there is phase separation between the different components in the nonaqueous electrolyte solution. It is noted that applicant specifically claims a halogen-containing compound and specifically in dependent claims a halogen containing compound containing an ether group, perfluoroether group, or perfluoroalkyl group as the flame retardant that is substantially immiscible in the non-aqueous electrolyte solution.

Applicant did not commented on the flame retardant material comprising the chemical formula $F(CF_2)_aF$ where a is 5-8 disclosed JP 10-012272 A (see paragraph 24 of machine translation) until recently with the filing of Exhibit A on 12/18/2003. The Examiner noted in the previous office action that for the flame-retardant material comprising the chemical formula $F(CF_2)_aF$ where a is 5-8 (see paragraph 24 of machine translation for JP 10-012272A), the formula reduces to C_8F_{18} when a is 8 which differs the molecular formula for the claimed flame retardant, perfluoro-1,3-dimethylcyclohexane (C_8F_{16}), by 2 fluorine atoms. The solubility properties of C_8F_{18} in the nonaqueous solvent is expected to be similar to the solubility properties of C_8F_{16} in the nonaqueous solvent.

The Examiner also stated in the previous office action that applicant has not experimentally determined that all of the flame retardant materials encompassed by the chemical formulas disclosed in JP 10-012272 A are miscible with all the possible nonaqueous electrolyte solutions disclosed in JP 10-012272 A.

In exhibit A filed by applicant on 12/18/2003, applicant experimentally reproduced the electrolyte containing system described in paragraph 43 of the machine translation of the reference. Applicant combined EC and DME in a 1:1 ratio which was then combined with C6F14 in a weight ratio of 85:15 where applicant experimentally determines and shows in Figure 1 of Exhibit A that the nonaqueous electrolyte solvent and C6F14 are substantially immiscible and forming a meniscus between them. Applicant then added the LiPF6 to the container with the EC/DME and C6F14 and the container was shaken and Figure 4 of the Exhibit shows that C6F14 quickly separates out, forming a meniscus with the electrolyte solution.

Exhibit A illustrates the Examiner's point that was also mentioned in the previous office action that some of the perfluoroalkyl and perfluoroether organic solvents encompassed by the reference may be substantially immiscible with the nonaqueous electrolyte solvent since perfluoroether compounds and perfluoroalkyl compounds are generically disclosed by applicants as the flame retardant materials of the present invention and the applicant only gave one example for the perfluoroalkyl compound, namely perfluoro-1,3-dimethylcyclohexane (C₈F₁₆) and did not give any examples for the perfluoroether compounds.

Thus, JP 10-012272 A discloses in at least one example in the reference as exemplified in paragraph 43 of the machine translation of an electrolyte-containing system for use with a battery which is an energy storage device, the electrolyte-containing system comprising:

a non-aqueous liquid electrolyte solution including an non-aqueous solvent (ethylene carbonate and 2-dimethoxyethane blended 1:1 vol. ratio) and a salt (LiPF₆):
and a flame retardant material(C₆F₁₄) that is a liquid at room temperature and pressure and substantially immiscible in the non-aqueous electrolyte solution, forming a meniscus when mixed with the non-aqueous electrolyte solution. The amount by weight of C₆F₁₄ is 15 wt% by weight of the non-aqueous electrolyte solvent. The concentration of LiPF₆ is 1 mole/liter.

The JP 10-012272 A reference also discloses that the flame retardant material can be 0.5 to 30 wt% of the nonaqueous electrolyte (see claim 4 and paragraph 30 of machine translation). The reference also discloses that 1,2-dimethoxyethane can be equivalently substituted as a hypoviscosity solvent by diethyl carbonate, dimethyl carbonate, or ethyl methyl carbonate (see claim 5 of machine translation). The reference also discloses that the salt concentration can range from 0.5 to 2.0 mol concentration (see paragraph 30 of machine translation).

Thus, the reference inherently anticipates the claims 1-15, and 25 as shown by Exhibit A filed by the applicant on 12/18/2003.

For the other examples in the reference not demonstrated by Exhibit A, they are inherently substantially immiscible with the nonaqueous electrolyte solution because these compounds belong to the same generic class of compounds claimed and disclosed by applicant as the invention.

Art Unit: 1745

The court has held that claiming of a property or characteristic which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See also MPEP 2112 and 2112.01. When the Examiner has provided a sound basis for believing that the products of the applicant and the prior art are the same, the burden of proof is shifted to the applicant to prove that the product shown in the prior art does not possess the characteristics of the claimed product. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

11. Claims 1, 2, 4-10, 12-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Arai et al. (US 2002/0160273 A1).

Arai et al. disclose an electrolyte containing system comprising a nonaqueous liquid solution including dimethyl carbonate and lithium tetrafluoroborate at 0.1 M concentration and nonafluorobutyl methyl ether as the flame retardant material that is a liquid at room temperature and pressure and substantially immiscible in the non-aqueous electrolyte solution, forming a meniscus as evidenced by the presence of two phases in the electrolyte containing system (see paragraphs 74 and 75 of the reference). The flame retardant material was mixed with the dimethyl carbonate at a volume ratio of 80 to 20.

Allowable Subject Matter

12. Claims 17-19, 26-31, 54, and 55 are allowed.

Art Unit: 1745

13. Claims 16 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claims 16, 24, and 26-31, the closest prior art of record, JP 10-012272 A, does not disclose, teach, or suggest perfluoro-1,3-dimethylcyclohexane or C15F33N as the flame retardant material in the electrolyte containing system.

With respect to claims 17-19, and 54, 55, the closest prior art of record, JP 10-012272 A does not disclose, teach, or suggest the additional distinguishing steps of first filling the casing at least partially with a nonaqueous electrolyte solution, waiting a period of time sufficient for the non-aqueous electrolyte solution to penetrate one or more pores of the electrode assembly, and then adding the flame retardant material that is a liquid at room temperature and pressure and substantially immiscible in the nonaqueous electrolyte solution. In contrast, JP 10-012272 A discloses pouring a nonaqueous electrolyte solution along with the flame retardant material in one step into the battery casing (see paragraph 42).

As stated above, during the personal interview conducted on 12/2/2003, applicant's representative gave a power point presentation which showed a significant difference in battery performance with respect to the order in which the electrolyte solution or flame retardant is added where adding electrolyte solution first gives a higher discharge capacity and lower resistance and adding flame retardant first that is immiscible with the nonaqueous electrolyte solution gives lower discharge capacity and higher resistance. In view of these unexpected results, method claims 17-19, 54, and 55 are allowed.

Response to Arguments

15. Applicant's arguments filed 11/13/2003 and 12/18/2003 have been fully considered but they are not persuasive.

Applicant's statement regarding the JP 10-012272 A reference on pages 18-19 of the amendment filed on 11/13/2003 appear to contradict the results shown in Exhibit A filed by applicant on 12/18/2003. Applicant states on pages 18-19 of the amendment that this reference does not teach or suggest an energy storage device comprising a nonaqueous electrolyte solution and a flame retardant material that are substantially immiscible, that is, when mixed, form a meniscus between them.

Exhibit A filed on 12/18/2003 shows the electrolyte system discussed in paragraph 43 of the reference does indeed have a meniscus between the flame retardant material and the nonaqueous electrolyte solution even after the two solutions are mixed which meets the claimed limitations of claims 1-15 and 25. Therefore, JP 10-012272 A is an anticipatory reference and not a teaching reference.

Applicant also asserts in the interview summary supplement filed on 12/18/2003 that because the JP 10-012272 A reference teaches mixing the flame retardant in the electrolytic solution, it does not in fact teach selecting combinations of materials for their immiscibility. In response to applicant's assertion, the reference teaching the mixing step does not preclude the formation of a meniscus between the two liquids after mixing.

Conclusion

16. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ 

Susy Tsang-Foster
Primary Examiner
Art Unit 1745